

A new species of septate gregarine, *Sphaerocystis odontotermi* n.sp. from the gut of a xylophagous termite, *Odontotermes* sp.

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Abstract. A new species of a septate gregarine, *Sphaerocystis odontotermi* n.sp. from the gut of the xylophagous termite, *Odontotermes* sp., is described.

Keywords. *Sphaerocystis odontotermi* n.sp.; *Odontotermes* sp.; isoptera; xylophagous termite.

1. Introduction

Gisler (1967) gave a checklist of all the gregarine parasites described from termite hosts. Subsequently Huger and Lenz (1976) described an unidentified coelomic gregarine from *Coptotermes acinaciformes*. Theodorides *et al* (1976) described 2 more species, *Gregarina darchenae* and *G. sp.* from *Cubitermes* sp. and *Basidentitermes potens* respectively. Kalavati (1977) reported an aseptate gregarine, *Diplocystis horni* from the adipose tissue cells of the termite, *Odontotermes horni*. Later Kalavati and Narasimhamurti (1978) added 3 new septate gregarines, *Gregarina macrotermitis* from *Macrotermes estherae*, (Desn.), *Steinina coptotermi* from *Coptotermes heimi* and *Anthorhynchus hanumanthi* from *Odontotermes* sp. and reviewed the validity of the species included in the checklist of Gisler (1967). Kalavati (1979) described an aseptate gregarine, *Monocystis odontotermi* from the haemocoel of *Odontotermes obesus* Rambur. Thus so far, a total number of 49 gregarines are described from termites of which 3 are aseptate gregarines and the others septate. In the following account a new species of a septate gregarine, *Sphaerocystis odontotermi* n.sp., from the gut of the xylophagous termite, *Odontotermes* sp., is described.

2. Material and methods

The termites were collected from beneath the decaying and drying leaves of cashew-nut plants from the Andhra University Campus at Waltair. The methods used to study the morphology and life-history of the parasite are the same as outlined in an earlier paper (Kalavati and Narasimhamurti 1978).

3. Observations

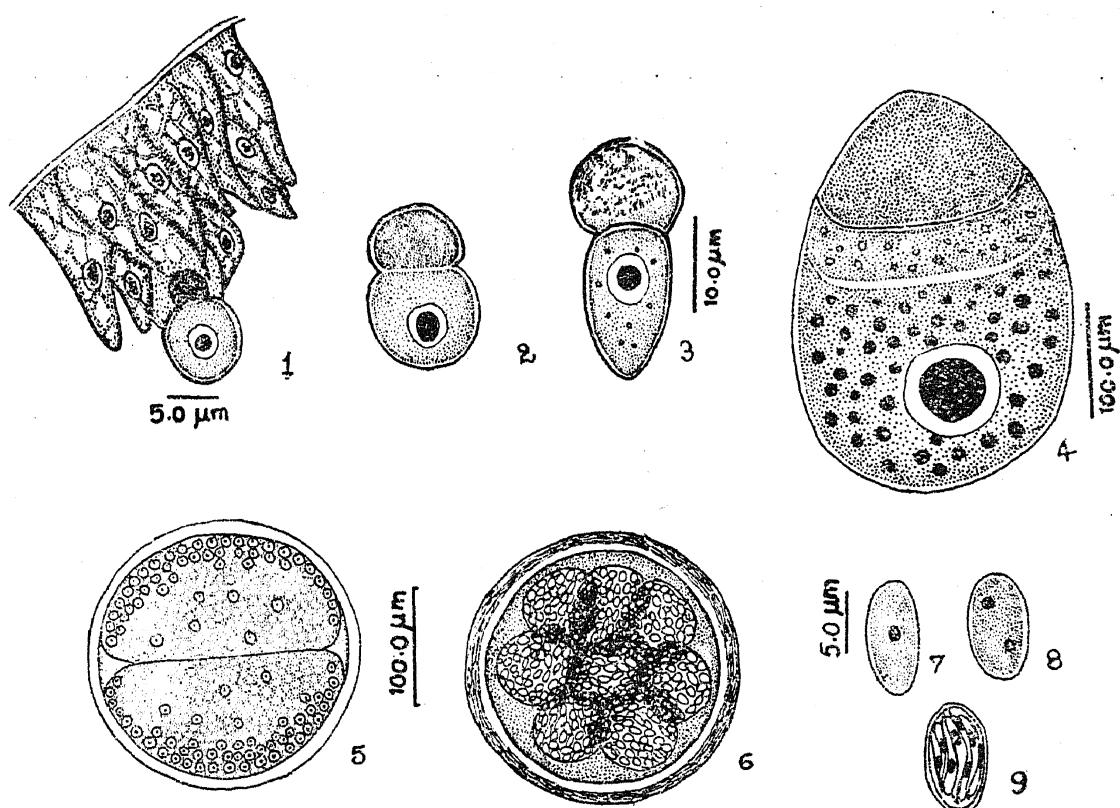
5% of the termites collected from a single colony were infected with a septate gregarine. Infected termites have a peculiarly distorted abdomen having a rusty brown colour. The earliest stage of the parasite was attached to the epithelial cells of the midgut and measured $11.1 \times 8.6 \mu\text{m}$. It has a small button-like epimerite having a diameter of $2.5 \mu\text{m}$ and was embedded in the host cell. The epimerite and the rest of the body were not demarcated by a septum but there was a discontinuity of the protoplasm between the two parts. The "deutomerite" is spherical measuring $8.6 \mu\text{m}$ in diameter and hangs into the lumen. The cytoplasm was hyaline and has no inclusions. The nucleus was vesicular and contains a single deeply-stained centrally-placed endosome (figure 1). As the parasite grows, the epimerite enlarges rapidly and assumes a dome-shaped appearance (figure 2). Cephalonts measuring $25 \times 125 \mu\text{m}$ showed clear septum between the epimerite and the rest of the parasite. The epimerite measured $8.5 \times 12.5 \mu\text{m}$. The cytoplasm in the epimerite was hyaline and stained more deeply than that in the deutomerite. The deutomerite was elongated measuring $15.5 \times 10.0 \mu\text{m}$ and contained alveolar cytoplasm containing a few refringent granules (figure 3). Cephalonts of different sizes were seen moving about in the lumen of the gut exhibiting a gliding type of locomotion. Fully grown cephalonts were found in the hindgut region. They were robust measuring $320 \times 200 \mu\text{m}$ and have a conical epimerite with rounded corners. A second segment representing the protomerite was clearly demarcated by a break in the continuity of the cytoplasm. It was rectangular in shape measuring $40 \times 180 \mu\text{m}$. It was filled with alveolar cytoplasm. The deutomerite measured $160 \times 200 \mu\text{m}$ and was filled with alveolar cytoplasm containing disc-like refringent bodies which are of the nature of carbohydrate reserve food material. The nucleus which was generally placed at the posterior end was spherical and contained a single deeply-stained spherical endosome. There was no extraendosomal chromatin material (figure 4).

Neither sporonts nor association stages were observed.

Cysts were spherical measuring $200-220 \mu\text{m}$ in diameter and had a mucous ectocyst $10-20 \mu\text{m}$ thick. Cysts collected from the hindgut and rectum were in an early stage of development and usually contained a few nuclei in each of the gametocytes. Cysts collected from the hindgut when kept in a moist chamber in the laboratory (28°C) showed fully formed gametes in about 24 hr. Gametes are isogamous, spherical in shape and measured $3.2 \mu\text{m}$ in diameter. They are arranged along the periphery (figure 5). Sporulation was completed in about 48 hr. The spores were arranged in the form of 7-8 "balls" inside the cyst, each of them being surrounded by a thin membrane. A small quantity of unused protoplasm was present in the centre (figure 6). The spores were ovocylindrical and octozoic measuring $10.0 \times 6.0 \mu\text{m}$ (figures 7, 8 and 9). Dehiscence was by simple rupture.

4. Systematic position

Three species of gregarine parasites, 2 aseptate, *Diplocystis horni* from *Odontotermes horni* and *Monocystis odontotermi* from *Odontotermes obesus* and one septate,



Figures 1-9. 1. A young trophozoite attached to the gut. 2-3. Trophozoites from the lumen of the gut. 4. A fully grown cephalont. 5. A cyst showing gametes. 6. A cyst showing spores. 7. A uninucleate sporoblast. 8. A bi-nucleate sporoblast. 9. A sporocyst showing sporozoites.

Anthorhynchus hanumanthi from *Odontotermes* sp. are so far reported from hosts related to the present one but none of them belongs to the genus *Sphaerocystis* Leger in which the present form is placed because of the presence of subspherical solitary sporonts, indistinct protomerite and ovocylindrical spores. So far only two species belonging to this genus, *S. simplex* Leger from *Cyphon pallidulus* (Coleoptera) and *S. termitis* from *Capritermes incola* (Isoptera) Desai and Uttangi (1962) have been reported from insect hosts. The present form has oval cephalonts and which are approximately same in size as in *S. simplex*. However, in the present form a distinct epimerite is present while it has not been described in *S. simplex*. The cysts in the present form have a diameter of 200-220 μm while, those in *S. simplex* have a diameter of 100 μm only (quoted from Kudo 1966). The present form also differs from *S. termitis* in having oval cephalonts measuring 170-220 μm while in the latter they were spherical having a diameter of 122-141 μm . The cysts in *S. termitis* are oval measuring 149 \times 114 μm while in the present form they are spherical having a diameter of 200-220 μm . The spores in the present form measure 10.0 \times 6.0 μm while those in *S. termitis* were smaller and measure 7.5 \times 5.0 μm . In view of the above mentioned differences the present form is considered a new species and the name *Sphaerocystis odontotermi* n.sp after the host is proposed.

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